

during the Pleistocene.³ Grant and Gale⁴ placed *pugetensis* as a subspecies of *hastatus*. It certainly has a superficial resemblance to *hastatus*, but the ribs differ in shape with wider interspaces which are covered by a minute reticulate sculpturing. This sculpturing is characteristic of *islandicus* and its allies and does not occur in *hastatus*. Unfortunately this minute sculpturing is not mentioned in Oldroyd's description. This Pecten forms a link in the intergrading series between *islandicus* and *hastatus* but for the present at least I do not prefer to consider it as a subspecies of either.

I have examined specimens of *pugetensis* in the George Willett collection which were taken by Mr. Willett at Craig and at Ketchikan, Alaska. This would give it a known range extending from Craig, Prince of Wales Island, Alaska, to Newport Bay, Orange County, California. I have fossil specimens, presumably Pliocene, which were taken at Deadman Island, San Pedro, Calif.

A GIANT RACE OF *HELMINTHOGLYPTA* FROM TULARE CO., CALIFORNIA

BY CLIFFORD C. CHURCH AND ALLYN G. SMITH

HELMINTHOGLYPTA TUDICULATA REX, new subspecies. Plate 8, figs. 10-12.

Diagnosis: Shell helicoid, very large for the species, moderately thick; spire low, with an angle of 125° ; whorls 6, the last well-rounded and rapidly expanding to form a sub-circular aperture of unusually large proportions; lip simple, not thickened, moderately reflected except at the base where the reflection is sufficient to conceal about one-half of the umbilicus, connected between terminations by a thin wash of callus; umbilicus rather small, being contained about 14 times in the major diameter of the shell. Nuclear whorls 2, finely granular under a lens of medium power except for the nucleus itself, which is glassy at the tip followed by a short wrinkled zone, the remainder of the nuclear whorls being relatively smooth. Sculpture of the early post-nuclear whorls consists of low but well-developed, closely spaced, growth ridges of unequal strength. Weak malleations begin to show on the second

³ Catalogue of the Marine Pliocene and Pleistocene Molluses of California, p. 162.

⁴ *Ibid.*, p. 168.



whorl from the last, becoming rapidly stronger until on the last whorl they are so exceedingly large and coarse that they dominate the entire appearance of the shell. They cover the last whorl except in the umbilical region and for a short distance behind the lip, where they become obsolete. Color much as in *tudiculata* s.s. but darker and with a more greenish cast, especially on the body whorl; the raised edges of the malleations are considerably lighter in color than the pits, thus making them stand out more sharply. The dark brown revolving band is nearly 2 mm. wide and is set off by two light-colored zones, each having almost the same width. The above is a description of the holotype, a fully mature specimen that measures: max. diam., 39.1 mm.; min. diam., 30.8 mm.; alt., 27.2 mm.

Holotype: Cat. No. 7189, Calif. Acad. Sci. Type Coll. (Collected by C. C. Church).

Type Locality: Under granite boulders along the tree-shaded initial terrace above the bed of the Middle Fork of the Tule River, about 2 mi. above and East of Springville, at the boundary of the Sierra National Forest, Tulare Co., California. *Paratypes*: Specimens so designated have been placed in the collections of the Academy of Natural Sciences of Philadelphia, the San Diego Society of Natural History, the Los Angeles Museum, and the private collections of E. P. Chace, S. S. Berry, and A. G. Smith. Two are in the California Academy of Sciences Type Collection, Nos. 7190 and 7191.

Material Studied: The type lot, consisting of 17 adult and 6 immature or broken shells (C. A. S. No. 28121) collected in July and October, 1933, by C. C. Church and G. D. Hanna. Also a second lot (C. A. S. No. 28181), consisting of 4 living adults and many immature specimens, which was collected 8 mi. East of Porterville, Tulare Co., Calif., on March 31, 1935, by the same collectors.

Remarks: The most striking characters of this subspecies are its uniformly great size, the extremely heavy malleations on the body whorl, and the light color of the edges of the malleations in comparison with the much darker color of the pits. While it is not believed that mere size should be the sole criterion in naming a new species or subspecies, it is believed that this shell exhibits a sufficient number of other different characters to warrant giving

it a name. As to size, we have seen occasional specimens of *Helminthoglypta arrosa* (Gld.), *Monadenia fidelis* (Gray), and *M. infumata* (Gld.) that are as large as a good-sized specimen of *H. tudiculata rex*, but we believe we are safe in the assertion that this represents the largest known California land snail.

It is most nearly related to *H. tudiculata kernensis* Berry¹ but in addition to larger average size it has a heavier shell, is more conspicuously and coarsely malleated, is darker and generally more greenish in color, and lacks the wide open umbilicus of *kernensis*. Some smaller adult specimens of *rex* approximate *kernensis* in size, however, so it is possible that with additional collecting in intervening territory an intergrading series linking the two subspecies may be found.

The range in size of *H. tudiculata rex* from the type locality is shown by measurements in the following table:

	Max. Diam.	Min. Diam.	Alt.	No. Whorls
Largest shell	42.6 mm.	33.2 mm.	28.6 mm.	6
Smallest shell	33.3 "	26.2 "	23.0 "	5-7/8
Average of 17 adults	38.4 "	30.2 "	26.7 "	6

Note: Of the 17 adults measured 5 had a maximum diameter of 40 mm. or more, and 9 were larger than 38 mm.

Land snails of the *tudiculata* group seem to be fairly abundant in the Tulare Co. foothill region of California. Judging from the evidence they seem to vary considerably with the locality. Dr. H. A. Pilsbry informs us that the Philadelphia Academy has shells referable to *rex* from Visalia, Cramer, and the Tule Indian Reservation, and some smaller shells (30-31.5 mm.) from Porterville. In the University of California is a lot of 5 shells (Univ. Calif. No. 2503) labeled "Tulare Co., Calif., D. O. Mills (collection)" ranging from 34.8 to 37.8 mm. but which do not exhibit the coarse malleation so characteristic of *rex*. We have examined two lots of shells smaller than *rex* but larger than *kernensis* found by one of us (Church) beside the small canal 3 miles East of Porterville on the Tule River and also among weeds and willow and cotton-

¹ Berry, S. S. NAUTILUS, Vol. 43, p. 40 (October, 1929); also Vol. 43, p. 138 correcting a mis-spelling of the subspecific name from "kermensis" to "kernensis."

wood leaves near the dry bed of Deer Creek where it enters the valley. Shells collected near Porterville by Hemphill (C. A. S. Nos. 8802-8805, incl.) are identical with those from Deer Creek. Young shells of what appears to be this smaller race (A. G. S. No. 5495) were collected at Bartlett Park on the South Fork of the Tule River, 12 miles East of Porterville.

At the type locality of *rex* two specimens (C. A. S. No. 28121-A) of a much smaller, thin-walled race of *tudiculata* referable to *tularensis* (Hemp.) were found with the large shells. Examples of this were collected also at three other places farther down in the foothills: in the granite hills back of Porterville, north of the main road up the Tule River; one-half mile north of Lindsay in the low hills capped by a jaspery rock from which crysoprase has been mined; and at Bartlett Park (A. G. S. No. 4604).

H. tudiculata tularensis (Hemphill) is readily distinguishable from *rex* and *kernensis* in spite of the overlapping of range with the former subspecies and its variants. However, it is a snail of the higher foothills at medium altitudes, where it reaches its maximum development.

The authors are indebted to Dr. Henry A. Pilsbry and to Dr. G. Dallas Hanna for assistance and advice on this brief study of an interesting problem of variation.

Berkeley, California, September 17, 1937.

EXTENDED RANGES OF NORTH PACIFIC SHELLS

BY WALTER J. EYERDAM

(Continued from page 104)

Lora nazanensis (Dall). Dredged 10 fathoms, shelly bottom, Elrington Island, Prince William Sound, Alaska. Former range: Norton Sound, Alaska, to Aleutian Islands. Extended range: About 700 miles eastward.

Lora becki (Moller). Twenty fathoms (not common), stony bottom, Drier Bay, Prince William Sound, Alaska. Former range: Bernard Harbor, Arctic Coast and southward. Extended range: About 600 miles southward.

Alvania alaskana (Dall). On stony algae, low tide, 5 specimens. Shuyak Strait, Afognak Island, Alaska. Former range: